

1 (Applicant) 6.13

# (12) UK Patent Application (19) GB (11) 2 178 637 A

(43) Application published 18 Feb 1987

(21) Application No 8515859

(22) Date of filing 22 Jun 1985

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(51) INT CL  
A23L 1/10

(52) Domestic classification (Edition 1):  
A2B MS1

(56) Documents cited  
GB A 2114416 GB 1544843 GB 1158549  
GB A 2074436 GB 1477753 US 4259359  
GB A 2055545

(58) Field of search  
A2B  
Selected US specifications from IPC sub-class A23L

#### (54) Food product and process for making it

(57) An expanded food product which has a high bran content and at least 5.0% by weight oil or fat which product is formed by cooking an aqueous slurry of ungelatinised starch and bran, forming the cooked slurry into portions and expanding the portions e.g. by frying.

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## SPECIFICATION

## Food product and process for making it

5 The present invention is an expanded food product and in particular a ~~snackfood~~ such as ~~crisps~~ 5 and the like.

Various processes for preparing expanded snackfood products have been described by Willard Snack Foods, 62, pages 52 to 54, 1973, (see also U.S. Patent Specification No.3,997,684) and Matz, Snack Food Technology, The AVI Publishing Company Inc., Westport, Conn., U.S.A., 10 pages 144 to 149). 10

According to the present invention there is provided an expanded food product comprising discrete cooked portions of an aqueous slurry comprising ungelatinised starch and bran, the product containing at least 5% by weight of oil or fat.

15 The invention also provides a process for producing a food product as defined above comprising forming an aqueous slurry, said slurry comprising ungelatinised starch and bran, and cooking the slurry to gelatinise it, separating the gelatinised product into discrete portions and cooking said portions to produce a product containing ~~at least 5% by weight oil or fat~~. 15

20 The expanded food product of the present invention is intended to be a "crisp-like" product. That is to say it should have a "fried" flavour imparted to it by the presence of at least about 5% by weight of saturated or unsaturated oil or fat, whether incorporated by frying or otherwise, e.g. by spraying on to the cooked product. In addition, the bran employed must not in itself nor on the amount in which it is employed impart to the snackfood organoleptic properties which significantly detract from a crisps-like feel and/or flavour. 20

25 The food product of the invention must be expanded, that is the portions from which it is derived are expanded by frying or other cooking processes generally to at least about 1.25 times their original volume, preferably to at least about 1.5 or about 1.6 times, more preferably to at least about 2 times, e.g. about 2.5 or 3 times their original volume. Surprisingly the incorporation of bran does not lead (as was expected) to a crisps-like snackfood in which the expansion is kept to an undesirably low level. Thus, ~~the food product containing 50% by weight bran~~ 25

30 ~~the mean expansion may be, for example, about 1.5 times.~~ 30

The food product of the invention is highly palatable and can contain a high content of bran, typically a content higher than that present in whole wheat flour which contains about 13% by weight of bran and preferably a content higher than that of whatever starch source is employed. Preferably the food product of the invention comprises from about 5 to about 70% by weight of 35 ~~bran, more preferably from about 20 to about 50% by weight of bran. The inclusion of bran in~~ 35

~~the food provides a highly palatable means of including fibre in a diet. The necessary level of fibre is often lacking in the diets of western populations.~~

40 To achieve the preferred level of bran in the final product up to about 75% by weight of bran may be included in the dry mixture from which the slurry is prepared. However, the especially preferred range for palatability is from about 15 to about 40% by weight of bran in the mixture. 40

45 Preferably the cereal bran used in the present invention is ~~wheat bran~~. However, other forms of cereal bran may be used where these are available and can produce the desired fibre content, for example, ~~oats, barley, rye, maize, rice, cassava, potatoes, tapioca, sago, legumes, and arrowroot.~~ Wheat bran usually provides about 45% by weight of fibre and accordingly a food product containing about 15% by weight or more of wheat bran will contain a significant and useful amount of fibre. 45

50 The starch component of the food product may be ungelatinised or may be a mixture of ungelatinised and gelatinised starch. It may be incorporated in the slurry in any convenient form. By way of example, the starch may be one obtained from wheat, oats, barley, rye, maize, rice, cassava, potatoes, tapioca, sago, legumes, and arrowroot. 50

55 Preferably the starch is ungelatinised and provided by incorporating a cereal flour, in particular wheat flour, or potato flour in the slurry.

A preferred process for preparing the food product of the invention comprises adding water to a mixture of bran and ungelatinised starch or a starch source to form a slurry, cooking the slurry to gelatinise at least part of the starch. During the cooking stage a physical change 55 occurs and the slurry becomes plastic in characteristic. This gelatinisation and setting of the slurry is essential to allow the sheet to be cut into the required shape prior to drying. The resultant sheet of rubbery material is sub-divided, for example by slicing, and the sub-divided sheet dried to form discrete portions known as the half product which can be cooked either by frying in fat or oil or, for example, by immersion in heated salt or calcium carbonate, or by 60 microwave cooking. 60

In the process of the invention frying may be accomplished in hot fat or oil, typically hot cooking oil, for a cooking time of from 5 to 100 seconds within the usual temperature range of from about 160°C to about 215°C.

65 Alternatively, half products, preferably of about 10 to about 15% moisture content by weight, can be cooked by heating the half product by immersion in a bed of hot particulate material 65

such as salt or calcium carbonate, and separating excess particulate material from the expanded cooked product. The cooked product can then be sprayed or otherwise treated to incorporate the necessary amount of oil or fat which affords the desired flavour.

The food product of the invention may be in any of the many usual discrete portions forms, 5 e.g. ~~thin~~ <sup>wafer</sup> such as crisps, rings, straws, ~~chips~~ <sup>spirals</sup>, small sausages and the like. 5

A variety of additives may be included in the food product of the present invention to provide the required visual and organoleptic properties.

Additives may be included either in the slurry or by spraying on to the cooked food. Thus, the palatability of the food product can be improved by adding flavouring agents, amongst the 10 preferred being salt and vinegar, cheese and/or onion, bacon, meat, fish, tomato, chicken and ham. Such flavouring agents are commercially available and may comprise hydrolysed vegetable protein, monosodium glutamate, common salt, spices, synthetic flavours and/or natural flavours, to give the required flavour and aroma. Typically up to about 30% by weight of flavouring agent 15 may be incorporated in the dry mixture from which the slurry is prepared by adding water, and the preferred level is about 10% by weight. 15

Flavour can be imparted to the product by using an ingredient which is inherently flavoured. For example peanut flavour incorporated in the slurry will give the product a peanut flavour, banana flour will impart a banana flavour and coconut flavour will impart a coconut flavour.

Currently, Health Authorities are tending towards a policy of wishing to limit salt in dietary 20 products and the like. Accordingly, if desired a snack food according to the invention for use in conjunction with a low salt or salt free dietary regime may have a "salty" taste provided by the inclusion of potassium and/or ammonium chloride in approximately the same amount by weight as (and a whole or partial substitute for) sodium chloride.

In addition the food product may be supplemented, for example by including a proteinaceous 25 supplement. Typically up to about 75% by weight of proteinaceous material may be incorporated in the dry mixture from which the slurry is prepared. Examples of such proteinaceous materials are milk proteins, especially caseinates, soya, wheat and corn gluten. The inclusion of proteinaceous material improves the nutritional value of the food product. 25

Another unexpected advantage of the food product of the present invention is that it has a 30 relatively low fat content compared with known crisps or the like, even when frying is used for cooking. One drawback of potato crisps and other fried snack foods is their high energy value, and it is a significant advantage of the present snack food that its energy value can be much less per unit weight than other foods not containing bran. 30

Thus, the present food product is advantageous in that it provides a good source of fibre in 35 any diet, it is highly palatable, it has a fried flavour, and yet since it can contain fewer calories than comparable known products not containing bran, it can be produced in a form acceptable to those on slimming diets. 35

The following Examples further illustrate the invention.

**40 EXAMPLE I** 40  
A mix was made of the following ingredients:-

Ungelatinised wheat flour	60 gm
Wheat bran	40 gm
45 Lecithin	5 gm

To this mix were added 200 gm water and the whole mixed well into a slurry. The slurry was fed onto a continuous belt at a constant thickness of 1.5 mm. The slurry was passed beneath suitable heaters and cooked and gelatinised into a rubbery sheet.

50 The sheet was partially dried, sliced into desired size, and the discrete pieces further dried to 10-15% moisture. 50

The dried slices were then cooked in hot vegetable fat for about 10 second at 195°C.

**EXAMPLE II** 55  
A mix was made of the following ingredients:-

Potato starch	60 gm
Wheat bran	30 gm
Flavouring	10 gm
60 Water	200 gm

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A snack food was prepared from this mix as described in Example I.

**EXAMPLE III** 65  
A mix was made of the following ingredients:-

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Potato starch	50 gm	
Potato flakes	20 gm	
Wheat bran	25 gm	
5 Flavouring	5 gm	5
Salt	1.5 gm	
Water	220 gm	

10 A snack food was prepared from this mix as described in Example I.

**EXAMPLE IV**

A mix was made of the following ingredients:-

Wheat starch	60 gm	
15 Wheat bran	40 gm	15
Glyceryl Monostearate	2 gm	
Water	200 gm	

20 A snack food was prepared from this mix as described in Example I.

**EXAMPLE V**

A mix was made from the following ingredients:-

Wheat starch	40 gm	
25 Rye flour	40 gm	25
Wheat bran	20 gm	
Salt	2 gm	
Lecithin	5 gm	
Water	210 gm	

30 A snack food was prepared from this mix as described in Example I.

**EXAMPLE VI**

A mix was made of the following ingredients:-

Wheat starch	50 gm	
35 Rice flour	40 gm	
Soya Protein Isolate	10 gm	
Lecithin	5 gm	
40 Water	220 gm	40

A snack food was prepared from this mix as described in Example I.

**CLAIMS**

45 1. An expanded food product comprising discrete cooked portions of an aqueous slurry comprising ungelatinised starch and bran, the product containing at least 5.0% by weight of oil or fat.

2. An expanded food product as claimed in Claim 1, wherein the product is expanded at least 1.25 times its original volume.

50 3. An expanded food product as claimed in Claim 1 or Claim 2, wherein the bran content is from 5 to 70% by weight.

4. An expanded food product as claimed in any preceding claim, wherein the starch component is derived from wheat, oats, barley, rye, maize, rice, cassava, potatoes, tapioca, sago, legumes, arrowroot or mixtures thereof.

55 5. A process for producing an expanded food product comprising forming an aqueous slurry containing ungelatinised starch and bran, cooking the slurry to bring about gelatinisation, separating the gelatinised slurry into discrete portions and cooking the portions to produce a product containing at least 5.0% by weight of oil or fat.

6. A process as claimed in Claim 5, wherein oil or fat is added during or after cooking.

60 7. A process as claimed in Claim 5 or Claim 6, wherein cooking causes expansion of the product to at least 1.25 times the original volume.

8. A process as claimed in any of Claims 5 to 7 wherein cooking is carried out at a temperature of from 180°C to 215°C.

9. An expanded food product as claimed in Claim 1 substantially as described herein.

65 10. A process for producing an expanded food product as claimed in Claim 5 substantially as

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described herein.

Printed for Her Majesty's Stationery Office by Burgess & Son (Abingdon) Ltd. Dd 8817358, 1987.  
Published at The Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.